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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,816	11/22/2002	Canan Uslu Hardwicke	120365	9642

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
SCHENECTADY, NY 12301-0008

EXAMINER

VERBITSKY, GAIL KAPLAN

ART UNIT	PAPER NUMBER
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2859

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/065,816

**Applicant(s)**

HARDWICKE ET AL.

**Examiner**

Gail Verbitsky

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-29 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The disclosure is finally objected to because of the following informalities:
  - A) Paragraph [0024] in page 6 is missing,
  - B) EXAMPLE in paragraph [0034] has not been described.
  - C) the “means for measuring a change” as stated in claims 1, 4 has not been clearly described in the specification. It appears from the newly amended claims that the “means for measuring a change” is different from a thermocouple as described in the specification, paragraphs [0028] and [0032] since now, the invention is directed to a strain or a combination of the strain and temperature measurement, but not a (single) temperature measurement. Therefore, applicant should provide means for measuring change in property relating to the strain and/ or combination of temperature and strain.  
Appropriate correction is required.

### *Drawings*

2. The drawings are finally objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “means for measuring a change” as stated in claims 1, 4 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 4 are finally rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In this case, the “means for measuring a change” as stated in claims 1, 4 has not been clearly described in the specification. It appears from the newly amended claims, that the “means for measuring a change” is different from a thermocouple as described in the specification, paragraphs [0028] and [0032], since now, the invention is directed to a strain or a combination of the strain and temperature measurement, but not a (single) temperature measurement. Therefore, applicant should provide means for measuring change in property relating to the strain and/ or combination of temperature and strain.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 4 are finally rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case, the claim language is confusing due to the reason stated above in paragraph 4.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 1 finally rejected under 35 U.S.C. 103(a) as being unpatentable over Boudreuax et al. (U.S. 4104605) [hereinafter Boudreuax].

Boudreuax discloses a system/ thin film strain gauge for measuring a condition (strain) of a turbine engine component (blade), the system comprises a first electrically non-conducting (dielectric/ insulative) film 20 being disposed on a substrate of the engine blade, at least a film of an electrically conducting material 14 disposed on said dielectric film 20. The dielectric film 20 is alumina. Boudreuax states that, from the prior art is known that alumina also acts as an adhesive to hold the structures together. Boudreuax states that the mechanical characteristics of the gauge remain unchanged preventing it from a premature failure, thus, in a broad sense, it is considered that the dielectric film, electrically conductive film and the substrate have thermal expansion coefficients allowing them to remain adhered throughout measurement cycle. Although, it is not clearly described, it is inherent that the device comprises a means/ evaluating means for actual measuring/ responding to a change in a property of the electric film and relating it to a condition of the blade.

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9. Claims 1, 3 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Article: "Thin film temperature sensors for gas turbine engines: problems and prospects" by Budhani et al. [hereinafter Article].

Article discloses a device in the field of applicant's endeavor. Article teaches to deposit thin film thermocouple (electrically conducting films/ dissimilar materials Pt/Rh/ two spaced apart thermocouple films/ legs) onto an insulator/ dielectric (first electrically non-conducting film) comprising NiCoCrAlY and aluminum oxide/  $Al_2O_3$ , the insulator remains dielectric and adhered when placed onto a substrate of a blade (component) during the entire cycle of measurement. The device measures change in property, such as a temperature of the blade by generating an electrical potential between the thermocouple legs (by definition of thermocouple). It is inherent, that, in order the thermocouple operate properly, both thermocouple legs join at some point to form a thermocouple (hot) junction, and otherwise, inherently, spaced apart. It is inherent, that thermal coefficients of expansion of all the films are selected so as to ensure that the films remain adhered to each other during heating/ measurements. Furthermore, it is inherent, that the device has a means to detect change in property of the thermocouple and relate it to a condition/ temperature change of the blade.

For claim 3: the device also comprises a *second insulation* aluminum oxide growth/ coating.

With respect to the preamble of claim 1: the preamble of the claims does not provide enough patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim is drawn to a structure and a portion of the claim following

the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. Kropa v. Robie, 88 USPQ 478 (CCPA 1951).

10. Claims 2 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Boudreux in view of JP 410034825A [hereinafter JP].

Boudreux discloses the device as stated above in paragraph 8.

Boudreux does not teach the thermal stress is less than 0.006, as stated in claim 2.

JP teaches to choose material of layers bonded to each other such that they have zero thermal stress (less than 0.006).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by Boudreux, so as to have a thermal strain between the dielectric layer and the substrate of zero, or less than 0.006, as taught by JP, so as to better correlated thermal expansion of the two adjacent films and thus, to improve an accuracy of the device.

11. Claims 5, 8-11, 13-18, 23, 25-27 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Article in view of JP.

Article discloses the device as stated above in paragraph 9.

Article does not disclose the limitations of claims 5, 8-11, 13-18, 23, 25-27.

JP teaches to choose material of layers bonded to each other such that they have zero thermal stress (less than 0.006).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by Article, so as to have a thermal strain between the dielectric layer and the substrate of zero, or less than 0.006, as taught by JP, so as to improve an accuracy of the device.

With respect to claims 17-18, 23, 25-27: the method steps will be met during the normal operation of the device stated above.

12. Claims 6, 7 and 24 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Article and JP, as applied to claims 5, 8-11, 13-18, 23, 25-27 above, and further in view of EP0908713A1 [hereinafter EP].

Article and JP disclose the device as stated above in paragraph 10.

Article and JP do not explicitly teach that the second electrically non-conducting layer (insulator/ dielectric) disposed on/ coating the thermocouple legs, as stated in claim 6, and a third dielectric film disposed between the thermocouple legs, as stated in claim 7.

For claim 6: EP teaches in Fig. 9i a device comprising a (second) protecting dielectric/ insulative (alumina) coating/ film 68 coating the thermocouple legs. Inherently, that in such a structure, the thermocouple legs 36 and 40 will be sandwiched between two dielectric films.



For claim 7: as shown in Fig. 5 and paragraph [0019] of EP, the thermocouple legs 36, 40 are laterally disposed and electrically isolated from each other and coated/separated by a (third) protecting dielectric layer 68.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose a second electrically insulative film on top of the thermocouple, disclosed by Article and JP, as taught by EP, so as to protect the thermocouple from contamination in a harsh environment, in order to provide more stability and thus, accuracy of measurements.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose a third electrically insulative film on top of the thermocouple, disclosed by Article and JP, as taught by EP, so as to protect the thermocouple from contamination in a harsh environment, in order to provide more stability and thus, accuracy of measurements.

With respect to claim 24: the method steps will be met during the normal operation of the device stated above.

13. Claim 19 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Article and JP, as applied to claims 5, 8-11, 13-18, 23, 25-27 above, and further in view of Prior Art as stated by Applicant in page 8 of the specification [hereinafter Prior Art].

Article and JP disclose the device as stated above in paragraph 11.

They do not explicitly teach the particular nozzle and means of deposition of the components as stated in claim 19.

Prior Art teaches that using OhmCraft and Sciperior direct writing apparatuses will satisfy the particular deposition requirements as required by the present application.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use OhmCraft or Sciperior, as taught by Prior Art, for deposition the thermocouple, disclosed by Article and JP, so as to provide a reliable method of deposition, known in the art, which allows to deposit a desired mixture at desired conditions, in order to provide desired thermocouple characteristics, and thus to provide a desired stability and accuracy of measurements.

With respect to claim 19: the method steps will be met during the normal operation of the device stated above.

14. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Article, JP and Prior Art as applied to claim 19 above, and further in view of Smialek et al. (U.S. 5275670) [hereinafter Smialek].

Article, JP and Prior Art disclose the device as stated above in paragraph 13.

They do not disclose the limitations of claims 20-22.

Smialek discloses a device in the filed of applicants' endeavor, the device can be attached to a surface of a gas turbine to measure its temperature. The device comprises thermocouple legs (films) that can be annealed in a CVD furnace at temperature 1400<sup>0</sup>C (heating) in order to provide homogenization of a coating and thus, to minimize instability. Particularly, the thermocouple is deposited onto a substrate by E-

beam heating and CVD, and then post coating diffusion (annealing/ heating) treatment is applied (entire col. 5). It is inherent, that the heat treatment is done before

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of deposition of the thermocouples, disclosed by Article, JP and Prior Art, as taught by Smialek, so as to provide a reliable method of deposition, known in the art, which allows to deposit a desired mixture at desired conditions, in order to provide desired thermocouple characteristics, and thus to minimize instability to ensure accurate measurements.

With respect to claims 20-22: the method steps will be met during the normal operation of the device stated above.

15. Claims 28, 29 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Article and JP, as applied to claims 5, 8-11, 13-18, 23, 25-27 above, and further in view of Chapman et al. (U.S. 6568848) [hereinafter Chapman].

Article and JP disclose the device as stated above in paragraph 11.

They do not explicitly teach a method of communicating temperature signal (link), i.e., RF, as stated in claims 28-29.

Chapman teaches that a temperature signal can be transmitted by RF.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the method of signal transmission, disclosed by Article and JP, with an RF signal transmission, as taught by Chapman, because both of them are alternate types of signal transmissions which will perform the same function, of

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transmitting the temperature signal, in order to be evaluated, if one is replaced with the other.

With respect to claims 28-29: the method steps will be met during the normal operation of the device stated above.

***Allowable Subject Matter***

16. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claim 4 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

***Response to Arguments***

18. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection necessitated by the present amendment.

***Conclusion***

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (703) 306-5473 Monday through Friday 8:00 to 4:00 ET.

Any inquiry of general nature should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

GKV

Gail Verbitsky

Primary Patent Examiner, TC 2800



April 07, 2004